

ANNUAL REPORT FOR 2002



Spring Branch Mitigation Site

New Hanover County

Project No. 8.2250109

TIP No. U-92 WM



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North Carolina Department of Transportation
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SUMMARY

The following report summarizes the monitoring activities that have occurred in 2002 at the Spring Branch Mitigation Site, representing the fifth year of monitoring.

The site is equipped with 3 groundwater-monitoring gauges, 2 surface gauges, and 1 rain gauge. The rain gauge, an automatic recording tipping bucket type, was installed on May 18, 2000. The data from the rain gauge was utilized for this report. Also, monthly rainfall data recorded from a rain gauge maintained by the NC State Climate Office in Wilmington was used for the historical data.

Hydrologic monitoring indicated SB-3 met jurisdictional hydrologic success of at least 12.5% during the growing season. SB-5 showed saturation between 8 and 12.5% of the growing season, while SB-1 showed saturation less than 5% of the growing season. The surface water gauges indicated a consistent presence of surface water throughout the growing season. During the 2002-monitoring year, the Spring Branch mitigation site experienced a below average rainfall year. Two of the gauges at Spring Branch experienced difficulty meeting success due to the dry climatic conditions for 2002.

Four vegetation-monitoring plots are located on the site. The site met the vegetation success criteria with an average of 434 trees per acre.

Based on monitoring results of 2002, which was a dry rainfall year and previous 4 years of monitoring, the Department recommends that all monitoring activities be discontinued at this site.

1.0 Introduction

1.1 Project Description

The Spring Branch Mitigation Site is located in New Hanover County, adjacent to the U-92C (Corps AID No. 199300597) alignment project in Wilmington (Figure 1). Approximately 11 acres in size, the site provides compensatory mitigation for a portion of the U-92C wetland impacts. The site consists of swamp and bottomland forest and an open water habitat. This establishes a wetland system including a creek, open water, and an associated floodway.

1.2 Purpose

In order to demonstrate successful mitigation, the Spring Branch site is monitored for both hydrology and vegetation for 5 years. 2002 marks the fifth year of monitoring for the site. The following report describes the results of both hydrologic and vegetation monitoring for 2002.

1.3 Project History

December 1997	Site Constructed
March 1998	Site Planted
March 1998	Monitoring Gauges Installed
March- November 1998	Hydrologic Monitoring (1 yr.)
August 1998	Vegetation Monitoring (1 yr.)
March- November 1999	Hydrologic Monitoring (2 yr.)
October 1999	Vegetation Monitoring (2 yr.)
March- November 2000	Hydrologic Monitoring (3 yr.)
September 2000	Vegetation Monitoring (3 yr.)
March- November 2001	Hydrologic Monitoring (4 yr.)
September 2001	Vegetation Monitoring (4 yr.)
March- November 2002	Hydrologic Monitoring (5 yr.)
October 2002	Vegetation Monitoring (5 yr.)

1.4 Debit Ledger

Spring Branch	Mit. Plan		TIP DEBIT
New Hanover			
Habitat	Acres at Start:	Acres Remaining	U-92C
SPH/BLH Restoration (1:1) Enhancement, Preservation	11	0	11
TOTAL		0	



2.0 Hydrology

2.1 Success Criteria

In accordance with federal guidelines for wetland mitigation, the success criteria for hydrology states that the area must be inundated or saturated (within 12" of the surface) by surface or ground water for a consecutive 12.5% of the growing season. Areas inundated less than 5% of the growing season are always classified as non-wetlands. Areas inundated between 5% - 12.5% of the growing season can be classified as wetlands depending upon factors such as the presence of hydrophytic vegetation and hydric soils.

The growing season in New Hanover County begins February 27 and lasts until November 26. These dates correspond to a 50% probability that air temperature will drop to 28° F or lower after February 27 and before November 26.¹ Thus the growing season is 271 days; optimum hydrology requires 12.5% of this season, or 34 days. Local climate must represent average conditions for the area.

2.2 Hydrologic Description

Three monitoring gauges, two surface gauges, and one rain gauge were installed in March of 1998 (Figure 2). Because of the amount of surface water on the site, each groundwater well was installed to record water levels both above and below ground level. Daily readings are taken throughout the growing season.

Appendix A contains a plot of the groundwater depth for each monitoring gauge. Data determined to be erroneous was omitted; therefore, some gaps appear in the plots. Daily rainfall is included on each graph as bars recorded by rain gauges located on the site.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

The maximum number of consecutive days that the groundwater was within twelve inches of the surface was determined for each well. This number was converted into a percentage of the 271-day growing season. Because it is uncertain if all wetlands impacted by NCDOT highway projects meet the 12.5% criteria, the monitoring well results are segmented into percentage ranges. Table 1 presents the monitoring results for the 2002 growing season as a range of percentages, actual percentage, and success dates of the longest hydroperiod on the site

¹ Soil Conservation Service, Soil Survey of New Hanover County, North Carolina, 1977.

Table 1. 2002 HYDROLOGIC MONITORING RESULTS

Monitoring Well	< 5%	5% - 8%	8% - 12.5%	> 12.5%	Actual %	
SB-1	✓				.74	
SB-3				✓	48.7	2/26-6/5 7/18-11/26
SB-5			✓		11.8	6/29-7/16 10/14-11/14

Specific Gauge Problems:

- SB-3 stopped recording data due to gauge malfunction (June 6-July 17)

During the growing season from February through November 2002, SB-3 met the optimum jurisdictional hydrologic success of at least 12.5% during the growing season. SB-5 showed saturation between 8 and 12.5% of the growing season, while SB-1 showed saturation less than 5% of the growing season. The surface water gauges indicated a consistent presence of surface water throughout the growing season. During the 2002-monitoring year, the site experienced a below average rainfall. The beginning of the growing season is the most critical time for a site; this is when the gauges will most likely meet success due to the recharge of rainfall before the growing season. When the rainfall for these months is below average, then the rain never fully recharges causing saturation levels to decrease. Two of the gauges at Spring Branch experienced difficulty meeting optimum success due to the dry climatic conditions for 2002. However, the previous four years of data indicates that the site has met hydrologic success.

Figure 3 represents a graphical representation of the hydrologic results. Gauges highlighted in blue indicate wetland hydrology for more than 12.5% of the growing season. Gauges highlighted in red show hydrology between 8% and 12.5% of the season, while those in green indicate hydrology between 5% and 8% of the season. Gauges highlighted in black indicate no wetland hydrology (less than 5% of the growing season).

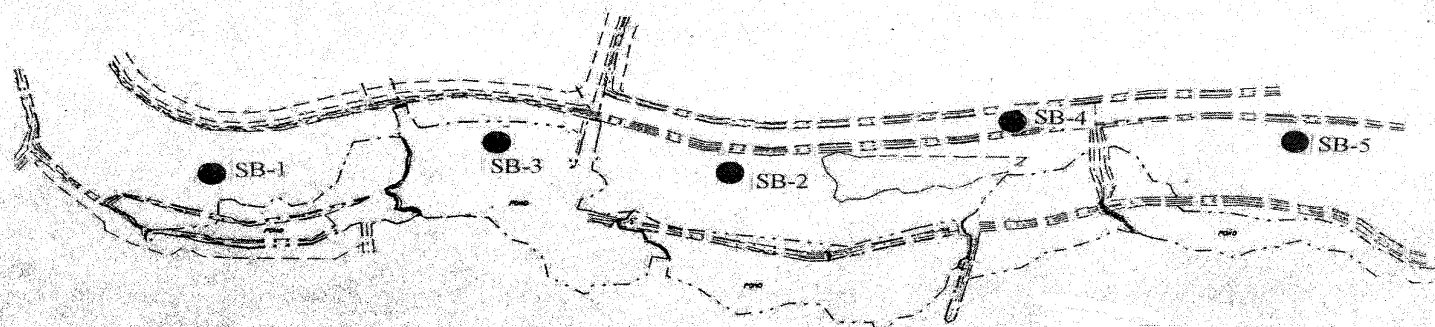
2.3.2 Climatic Data

Figure 4 represents an examination of the local climate in comparison with historical data in order to determine whether 2002 was “average” in terms of climate conditions. The two lines represent the 30th and 70th percentiles of monthly precipitation for Wilmington, NC. The bars are monthly rainfall totals for 2001 and 2002. The historical data was collected from the State Climate Office of North Carolina.

The months of July, September and October were considered “average”. November 01, December 01, January, February, April, May, and June were considered below “normal”. March and August were above “normal” months. Overall the site experienced below average rainfall in 2002

2.4 Conclusions

During the 2002-monitoring year, the site experienced below average rainfall. For this reason two of the gauges (SB-5 & SB-1) experienced difficulty meeting success due to the dry climatic conditions for 2002. SB-3 met jurisdictional hydrologic success of at least 12.5% during the growing season. The surface water gauges indicated a consistent presence of surface water throughout the growing season. Based on the past 5 years, the site has demonstrated hydrologic success and is classified as a wetland. Therefore, the department proposes to discontinue monitoring at this site.



SB-1 GROUNDWATER GAUGE
SB-2 SURFACEWATER GAUGE
SB-3 GROUNDWATER GAUGE
SB-4 SURFACEWATER GAUGE
SB-5 GROUNDWATER GAUGE

FIGURE 2
SPRING BRANCH
GAGE LOCATION MAP

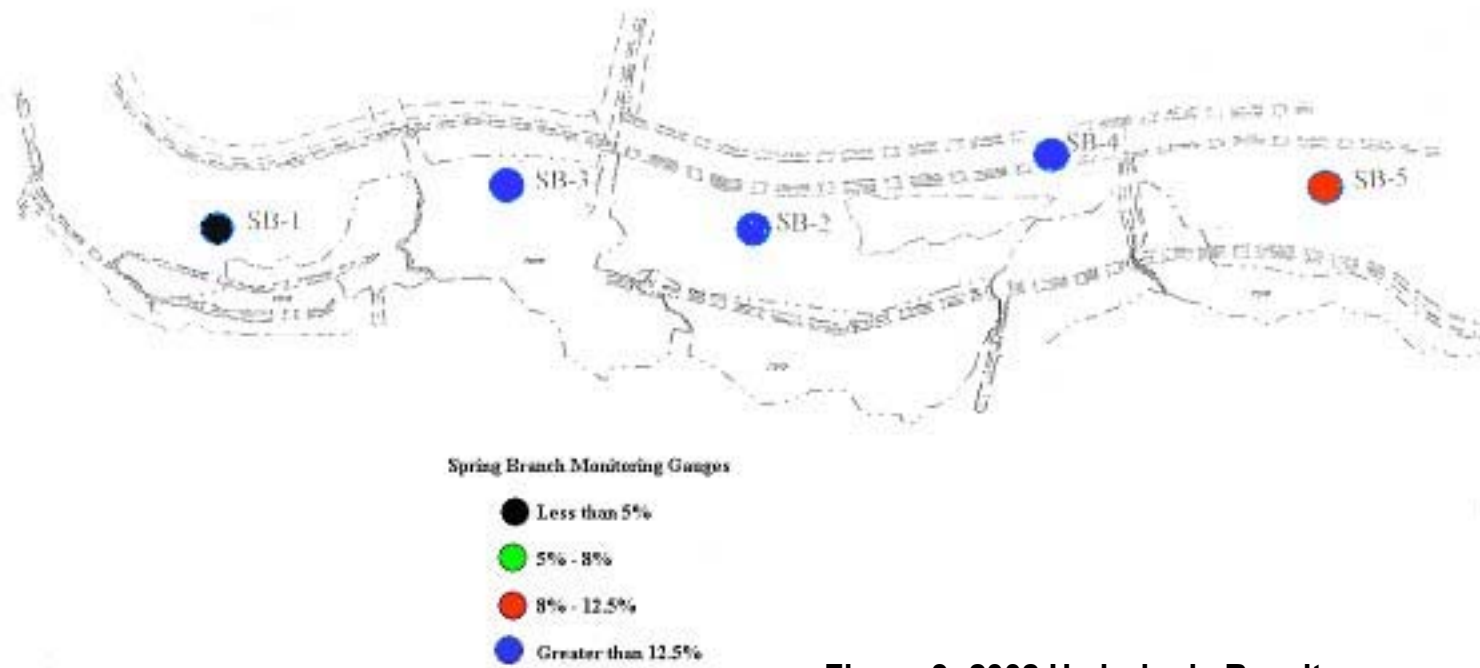
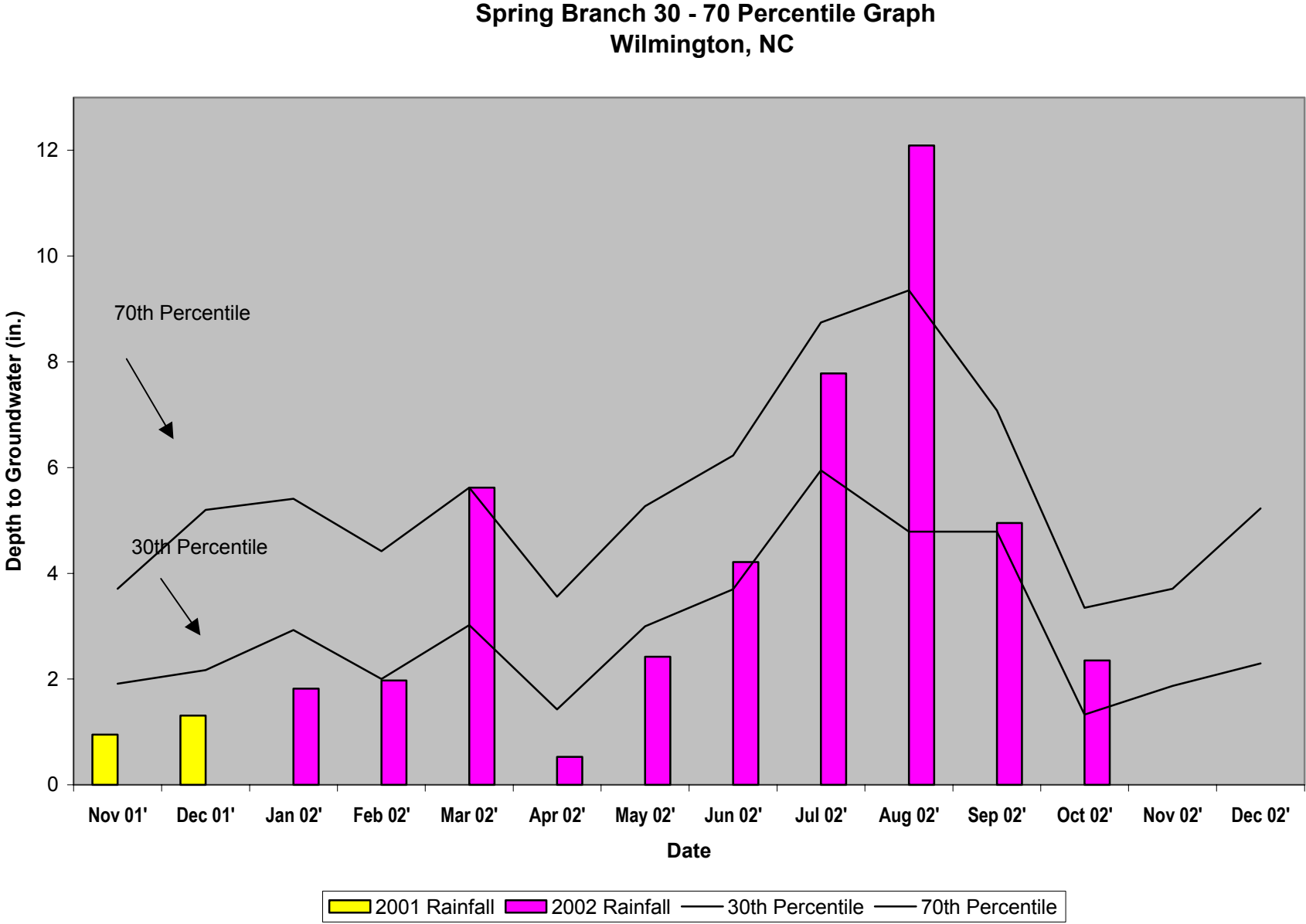


Figure 3: 2002 Hydrologic Results

Figure 4: 2002 30-70 Percentile Graph



3.0 VEGETATION: SPRING BRANCH MITIGATION SITE (YEAR 5 MONITORING)

3.1 Success Criteria

Success Criteria states that there must be a minimum of 320 trees per acre surviving for three consecutive years. NCDOT has agreed to monitor this site for 5 years or until success criteria is met. The required survival criterion will decrease by 10% per year after the third year of vegetation monitoring (i.e., for an expected 290 stems per acre for year 4, and 260 stems per acre for year 5).

3.2 Description of Species

The following tree species were planted in the Wetland Restoration Area:

Nyssa aquatica, Tupelo Gum

Quercus lyrata, Overcup Oak

Taxodium distichum, Baldcypress

Quercus falcata var. *pagodaefolia*, Cherrybark Oak

Cephalanthus occidentalis, Buttonbush

3.3 Results of Vegetation Monitoring

Plot # (Type)	Baldcypress	Tupelo Gum	Buttonbush	Overcup Oak	Total (5 year)	Total (at planting)	Density (Trees/Acre)
1 (BLH)	2	19			21	29	492
2 (BLH)	6	17	1		24	44	371
3 (BLH)	11	5		3	19	40	323
4 (BLH)	8	20	1	1	30	37	551
AVERAGE DENSITY							434

Site Notes: Other species noted: black willow, *Juncus* sp., *Cyperus* sp., cattail, smartweed, woolgrass, *Pluchea* sp., cardinal flower, and *Bidens* sp. 6 to 24 inches of standing water noted throughout site in various locations. Several oaks noted outside of Plot 2 in higher elevations. Beaver dam was removed by NCDOT in October 2001.

3.4 Conclusions

A total of 9.5 acres on this site involved tree planting. Four vegetation monitoring plots were established in the planting area. The 2002 vegetation monitoring of these plots revealed an average density of 434 trees per acre, which is well above the success criteria requirement of 260 trees per acre.

NCDOT proposes to discontinue vegetation monitoring at the Spring Branch Mitigation Site.

4.0 Overall Conclusions/ Recommendations

Though originally proposed for a three-year monitoring period, it was agreed to modify the monitoring period to five years.

Based on five years of hydrologic data, the site has met the optimum hydrological success criteria for the first four years. Due to dry climatic conditions for 2002, 2 gauges had difficulty in meeting optimum hydrologic success. For 2002, the local climate did not represent average conditions. NCDOT proposes to discontinue hydrologic monitoring.

During the fifth year of monitoring, vegetation monitoring yielded an average density of 434 trees per acre. NCDOT proposes to discontinue vegetation monitoring at the Spring Branch Mitigation Site.

APPENDIX A

Depth to Groundwater / Surfacewater Plots

APPENDIX B

Site Photos & Photos and Plot Locations

Spring Branch



Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6

SPRING BRANCH MITIGATION SITE
New Hanover County
Photo and Plot Locations

